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# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. **NPP022US**  
 First Inventor **PAUL LAPSTUN**  
 Title **PRINTER WITH MANUAL COLLATION CONTROL**  
 Express Mail Label No. **EJ776407164US**

## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17)  
*(Submit an original and a duplicate for fee processing)*
2. ☒ Applicant claims small entity status.  
 See 37 CFR 1.27.
3. ☒ Specification [Total Pages **19**]  
*(preferred arrangement set forth below)*  
 - Descriptive title of the invention  
 - Cross Reference to Related Applications  
 - Statement Regarding Fed sponsored R & D  
 - Reference to sequence listing, a table,  
 or a computer program listing appendix  
 - Background of the Invention  
 - Brief Summary of the Invention  
 - Brief Description of the Drawings (if filed)  
 - Detailed Description  
 - Claim(s)  
 - Abstract of the Disclosure
4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets **4**]
5. Oath or Declaration [Total Pages **3**]  
 a. ☒ Newly executed (original or copy)  
 Copy from a prior application (37 CFR 1.63 (d))  
 b. ☐ (for continuation/divisional with Box 17 completed)  
 i. ☐ **DELETION OF INVENTOR(S)**  
 Signed statement attached deleting inventor(s)  
 named in the prior application, see 37 CFR  
 1.63(d)(2) and 1.33(b).
6. ☐ Application Data Sheet. See 37 CFR 1.76

ADDRESS TO: Assistant Commissioner for Patents  
 Box Patent Application  
 Washington, DC 20231

7. ☐ CD-ROM or CD-R in duplicate, large table or  
 Computer Program (Appendix)  
 8. Nucleotide and/or Amino Acid Sequence Submission  
*(if applicable, all necessary)*  
 a. ☐ Computer Readable Form (CRF)  
 b. Specification Sequence Listing on:  
 i. ☐ CD-ROM or CD-R (2 copies); or  
 ii. ☐ paper  
 c. ☐ Statements verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

9. ☒ Assignment Papers (cover sheet & document(s))  
 10. ☐ 37 CFR 3.73(b) Statement ☐ Power of  
*(when there is an assignee)* Attorney  
 11. ☐ English Translation Document *(if applicable)*  
 12. ☐ Information Disclosure ☐ Copies of IDS  
 Statement (IDS)/PTO-1449 Citations  
 13. ☐ Preliminary Amendment  
 14. ☐ Return Receipt Postcard (MPEP 503)  
*(Should be specifically itemized)*  
 15. ☒ Certified Copy of Priority Document(s)  
*(if foreign priority is claimed)*  
 16. ☐ Other: \_\_\_\_\_

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment,  
 or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-In-part (CIP) of prior application No. \_\_\_\_\_  
 Prior application information, Examiner \_\_\_\_\_ Group / Art Unit \_\_\_\_\_

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under  
 Box 5b, is considered a part of the accompanying continuation or divisional application and is hereby incorporated by reference.  
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## 18. CORRESPONDENCE ADDRESS

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09/721856  
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Docket No.: *NPP022US***Certificate of Mailing under 37 CFR 1.8**

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Evelyn Wai-Lin Mak

Typed or printed name of person signing Certificate



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*Submitted herewith Utility Patent Application Transmittal and enclosures for an invention entitled "CODE SENSOR ATTACHMENT FOR PEN".*

Express Mail Label:

**EJ776407164US**

# FEE TRANSMITTAL for FY 2001

Patent fees are subject to annual revision

TOTAL AMOUNT OF PAYMENT (\$)**490**

## Complete if Known

Application Number  
Filing Date  
First Named Inventor  
Examiner Name  
Group Art Unit  
Attorney Docket No. **NPP022US**

## METHOD OF PAYMENT

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to

Deposit Account Number  
Deposit Account Name

☐ Charge Any Additional Fee Required Under 37 CFR 1.15 and 1.17

☐ Applicant claims small entity status See 37 CFR 1.27

2. ☒ Payment Enclosed:

☒ Check ☐ Credit card ☐ Money Order ☐ Other

## FEE CALCULATION

### 1. BASIC FILING FEE

Large Entity	Small Entity	Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
101	710	201	255	Utility filing fee	355
106	320	206	160	Design filing fee	
107	490	207	245	Plant filing fee	
108	710	208	355	Resubmission filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) (\$)**355**

### 2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
25	-20** = 5	X 9	= 45
2	-3** = 0	X 40	= 0

Multiple Dependent

Large Entity	Small Entity	Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
103	18	203	9	Claims in excess of 20	
102	80	202	40	Independent claims in excess of 3	
104	270	204	135	Multiple dependent claim, if not paid	
109	80	209	40	** Reissue independent claims over original patent	
110	18	210	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$)**45**

\*for number previously paid, if greater. For Reissues, see above

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

Large Entity	Small Entity	Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for ex parte reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	390	216	195	Extension for reply within second month	
117	890	217	445	Extension for reply within third month	
118	1,390	218	695	Extension for reply within fourth month	
128	1,890	228	945	Extension for reply within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,240	241	620	Petition to revive - unintentional	
142	1,240	242	620	Utility issue fee (or reissue)	
143	440	243	220	Design issue fee	
144	600	244	300	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Sheet	
581	40	581	40	Recording each patent assignment per property (times number of properties)	80
146	710	246	355	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	710	249	355	For each additional invention to be examined (or 37 CFR § 1.129(b))	
179	710	279	355	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	

Other fee (specify)

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)**80**

## SUBMITTED BY

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Registration No.  
(Attorney/Agent)

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Date **Nov. 22, 2000**

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## PRINTER WITH MANUAL COLLATION CONTROL

### FIELD OF INVENTION

The present invention relates to printing documents and, more particularly, is directed toward a printer which prints collated multi-page documents from a plurality of manually

5 collated pages.

### CO-PENDING APPLICATIONS

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention simultaneously with the present invention:

- 10 NPA060US, NPA061US, NPA081US, NPA082US, NPP010US, NPP013US,  
NPP015US, NPP020US, NPP021US, NPP022US, NPP023US, NPS014US,  
NPS015US, NPS017US, NPS018US, NPS022US, NPS027US, NPS028US,  
NPT008US, BIN01US, BIN02US, BIN03US, BIN04US

- 15 The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

- Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 20 October 2000:

NPA011US, NPA031US, NPA040US, NPA046US, NPA053US, NPA059US,  
NPA064US, NPB006US, NPS004US, NPS008US, NPS013US, NPS024US,  
UP01US, UP02US, UP03US, UP04US, UP05US

- 25 The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

- Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 15 September 2000:

30 NPP022US

NPA024US, NPA025US, NPA047US, NPA049US

The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 30 June 2000:

10 NPA014US, NPA015US, NPA022US, NPA026US, NPA038US, NPA041US,  
NPA050US, NPA051US, NPA052US, NPA063US, NPA065US, NPA067US,  
NPA068US, NPA069US, NPA071US, NPA072US, NPB003US, NPB004US,  
NPB005US, NPP019US, PEC04US, PEC05US, PEC06US, PEC07US

The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 23 May 2000:

20 NPA001US, NPA002US, NPA004US, NPA005US, NPA006US, NPA007US,  
NPA008US, NPA009US, NPA010US, NPA012US, NPA016US, NPA017US,  
NPA018US, NPA019US, NPA020US, NPA021US, NPA030US, NPA035US,  
NPA048US, NPA075US, NPB001US, NPB002US, NPK002US, NPK003US,  
NPK004US, NPK005US, NPM001US, NPM002US, NPM003US, NPM004US,  
25 NPN001US, NPP001US, NPP003US, NPP005US, NPP006US, NPP007US,  
NPP008US, NPP016US, NPP017US, NPP018US, NPS001US, NPS003US,  
NPS020US, NPT001US, NPT002US, NPT003US, NPT004US, NPX001US,  
NPX003US, NPX008US, NPX011US, NPX014US, NPX016US, IJ52US,  
IJM52US, MJ10US, MJ11US, MJ12US, MJ13US, MJ14US,  
30 MJ15US, MJ34US, MJ47US, MJ58US, MJ62US, MJ63US,  
PAK04US, PAK05US, PAK06US, PAK07US, PAK08US, PEC01US,  
PEC02US, PEC03US

The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2817 2

## BACKGROUND

Multi-page documents often include content created using a diversity of desktop applications including word processing, drawing, graphing and spreadsheet tools. Because of operating system and middleware complexity, many users are unable to

5 integrate diverse content into a single presentation document. In many cases, a single presentation document combines content created by different users, all of whom may have particular application skills, but none of whom may have content integration skills. Because of this users often resort to manual collation.

- 10 The problem becomes particularly apparent when multiple copies of a multiple page collated document are required. If it is difficult or impossible for the user to print out the pages in the desired, collated order, then the user typically has to finish the process by manually collating each individual multi-page document copy. The degree of complexity in this process depends on the number of pages in each copy and the number of copies printed.
- 15 If the printed multi-page documents are to be bound, the necessity of manual collation prevents full automation of the process, as proper collation must occur before the binding step.

## SUMMARY OF INVENTION

- It is an object of the present invention to provide a new printer for and method of
- 20 printing collated documents.

The present invention provides, in a first aspect, a printer for printing a collated multi-page document when presented with a plurality of manually collated pages, the printer including:

- (a) a code sensor which senses machine-readable codes on the manually collated
- 25 pages;
- (b) a control unit which uses the machine-readable codes to identify and retrieve previously stored electronic versions of the pages; and
- (c) a print engine which prints the retrieved pages.

Preferably the printer includes a binder for binding together the printed pages, and a scanner for copying pages which do not have machine-readable codes on them and which produces electronic versions of the pages.

- 5 Preferably also the printer includes a storage medium which stores the electronic versions of the scanned pages, and a hand-held code sensor which senses machine-readable codes on the manually collated pages wherein the machine-readable codes on the manually collated pages are represented:

- (a) optically; or
- (b) electronically; or
- 10 (c) magnetically; or
- (d) topographically; or
- (e) chemically.

- 15 Preferably the code sensor senses machine-readable codes on both sides of the manually collated pages, and the control unit also controls communications between the printer and one or more peripheral devices. Preferably electronic versions of the manually collated pages which are to be printed are retrieved from at least one of the group including:

- (a) a storage medium contained within a host computer;
- (b) a server which is accessed over a computer network;
- 20 (c) a storage medium contained within the printer itself; or
- (d) any combination of the above.

- 25 Preferably the printer includes an input device with which a user of the printer controls the format of the printed and collated multi-page document, wherein the input device includes a touch sensitive display, and wherein the print engine also prints machine-readable codes onto a page, and wherein the machine-readable codes are not visible to human vision. Preferably also the printer inserts blank pages in the printed document to duplicate blank pages contained within the manually collated pages. Preferably instructions from a hand-held code sensor are received and interpreted, and a collated



multi-page document is produced.

Preferably the printer includes an interface which transmits instructions for printing a collated multi-page document to a second printer, wherein the instructions are transmitted over a computer network or over a telephone network. Also preferably the  
5 printer includes a storage medium which stores an electronic version of pages which have been printed.

In a second aspect, the invention provides a method of printing a collated multi-page document when presented with a plurality of manually collated pages, the method including the following steps:

- 10 (a) sensing machine-readable codes on the manually collated pages using a code sensor;  
(b) using the machine-readable codes to identify and retrieve previously stored electronic versions of the pages; and  
(c) printing the retrieved pages.
- 15 Preferably the invention provides a method including the step of binding together the printed pages, and further including the steps of using a scanner for copying pages which do not have machine-readable codes on them and producing electronic versions of those pages. Preferably also the step of printing the retrieved pages includes printing machine-readable codes on those pages, and wherein the machine-readable codes are invisible.
- 20 Preferably the code sensor senses machine-readable codes on both sides of the manually collated pages.

Preferably the method includes the step of using an input device to control the format of the printed and collated multi-page document, and wherein the printing step includes the sub-step of transmitting the retrieved pages to a remote printer.

- 25 The invention will now be described in greater detail by reference to the attached drawings. It is to be understood that the particularity of the embodiments illustrated in the drawings does not supersede the generality of the foregoing description of the invention.

## **BRIEF DESCRIPTION OF DRAWINGS**

Preferred and other embodiments of the invention will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Figure 1 illustrates a printer with electronic collator according to the preferred  
5 embodiment of the invention;

Figure 2 illustrates the printing and binding path for an embodiment of the invention;

Figure 3 illustrates the copying path for an embodiment of the invention;

Figure 4 is a block diagram of a printer controller according to an embodiment of the invention;

10 Figure 5 is a partial block diagram of a printer controller with facsimile modem according to an embodiment of the invention; and

Figure 6 is a flow diagram of a printing and copying control process.

## DETAILED DESCRIPTION OF PREFERRED AND OTHER EMBODIMENTS

A page can be printed with one or more machine-readable codes which identify an electronic version of the page stored in a computer system. This can allow the page to be used as a token for obtaining a pristine digital copy of the page, described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. NPA031US), obviating any need to physically scan and print (i.e. "photocopy") the page. It can also allow the page to be used in conjunction with a hand-held code-sensing device to capture user input in relation to the page, such as handwriting and hyperlink activations described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. NPP023US). The machine-readable codes are preferably unobtrusive and ideally invisible, e.g. printed using an ink which is machine-readable but invisible to the unaided human eye, such as an infrared-absorptive ink.

Various workgroup printers have been described which also act as "walk-up" document terminals, i.e. they provide a user interface which allows a document to be selected and printed without recourse to a workstation, and in particular, without recourse to a workstation with access to the original electronic version of the document. An example of such a workgroup printer is described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. SP05US). Documents which may be selected and printed in this way are typically documents which have been previously printed via the printer, and in the process stored on the printer's internal hard disk. To optimize printing speed, the documents are typically stored in a rasterized or partially-rasterized format. A user may have the option to "print" a document to the printer's hard disk, i.e. to make it available for walk-up printing without actually printing it.

A walk-up printer may utilize storage on a local-area or wide-area network rather than having its own internal storage, and a group of such printers may have access to a shared document repository. A walk-up printer may also simply record links to original documents rather than making copies.

A printer may include a binding mechanism for binding the pages of a document into a single whole. Various binding mechanisms suitable for inclusion in a high-speed workgroup printer are described further in our co-filed application USSN 09/\_\_\_\_\_

(docket no. BIN01US). Since a document must typically be sent to a printer as a single document to produce a bound copy, document integration is normally a prerequisite for binding. This presents a barrier to many users.

The present invention concerns a printer which can produce one or more bound documents when presented with a manually-collated bundle of pages. The printer contains a code sensor for sensing machine-readable codes on the pages, allowing it to identify and produce printed copies of the pages from electronic versions of the pages. The printer optionally contains a scanner for copying pages which are not coded.

The copying process may be used to produce double-sided output from single-sided input. Blank pages can be interspersed with the input to force the inclusion of blank pages.

As illustrated in Figure 1, the printer of the preferred embodiment has two input trays, one for source pages 1012, the other for sheets 1014 of an input medium such as paper. The paper path includes an input transport mechanism 1022, one or more code sensors 1024, one or more print engines 1026, an output transport mechanism 1028, and a binding mechanism 1030, 1032. A printer controller 1040 controls the printing process.

The printer has a single output tray in which it accumulates both decoded source pages 1012 and printed and bound documents 1020. As an alternative, the printer may have separate output trays for source pages and documents. It may, for example, deposit decoded source pages back in the source page input tray, typically separated from input source pages by a mechanical finger which prevents already-sensed source pages from being treated as further input.

In the preferred form of the printer, source page sensing and printing both utilize the same paper transport mechanism. As an alternative, the printer may contain separate page sensing and printing paper paths and associated transport mechanisms.

The preferred binding mechanism, described further in our co-filed application USSN 09/\_\_\_\_\_ (docket no. BIN01US), consists of a page-height adhesive applicator 1030, and a page-height stamper 1032. The adhesive applicator applies a strip of adhesive adjacent to the spine of a page just before the page enters the output bin. The stamper 1032 presses the pages in the output bin together, causing pages with adhesive strips to

adhere to each other. Adhesive may be applied to either the front or the back of each page of a document. When it is applied to the front, it is not applied to the first page. When it is applied to the back, it is not applied to the last page. The stamper is typically operated after the last page of the document is printed, although if adhesive is applied to the front of each (face-down) page, then the stamper may be used after each page is printed or periodically during the printing of a document. Alternative binding mechanisms include corner or page-height stapling and clamping.

The preferred code sensor 1024, described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. NPP023US), consists of a light source, projection and image capture optics, and an image sensor. Codes are represented by optical patterns which are printed or otherwise applied to a surface, for example as described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. NPP023US). As a source page 1012 is transported past the code sensor 1024, the printer controller 1040 captures images of the page surface via the image sensor, decodes the optical patterns found in the images, and thereby obtains one or more codes which directly or indirectly identify the source page and/or a document of which the source page is part. Codes may alternatively be represented electronically, magnetically, topographically, or chemically, with correspondingly adapted code sensors.

During printing, as illustrated in Figure 2, the input transport mechanism 1022 picks up an input sheet 1014, the print engines 1026 print the page content onto one or both sides of the sheet, and the output transport mechanism 1028 deposits the sheet in the output tray. The adhesive applicator 1030 applies adhesive 1018 to one side of the sheet just before it is deposited in the output tray, and the stamper 1032 presses the several sheets of a document together in the output tray to form a bound document 1020.

During code sensing, as illustrated in Figure 3, the input transport mechanism 1022 picks up a source page 1012, the processor senses codes from one or both sides of the source page via the code sensors 1024, and the output transport mechanism 1028 deposits the source page in the output tray. Copying consists of a code sensing phase followed by a printing phase. In the preferred arrangement, the code sensors are a fixed part of the apparatus. As an alternative to this arrangement, the code sensor may be embodied in a hand-held device, such as a suitably enabled pen or stylus, as described further in our

earlier application USSN 09/\_\_\_\_\_ (docket no. NPS027US), so that the user specifies how the printed document is collated by manually sensing a set of pages, in which case the printer need not necessarily include the code sensor 1024 in the paper path.

- 5 The printer is ideally enabled for printing codes which it can subsequently sense. This is not a requirement, however, and the printer may simply be used in conjunction with source pages printed by another printer.

- The printer may also be enabled, described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. NPP023US), for receiving, interpreting and/or relaying  
10 transmissions from a hand-held code sensing device, such as a suitably enabled pen or stylus, as described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. NPS027US).

- The printer has a user interface which minimally provides a "copy" button. The user inter-face may also include a color touch-sensitive display which allows a user to browse  
15 a list of documents accessible to the printer, and select a particular document for printing. The copy button may also be provided in virtual form on the display. When the user presses the copy button, the printer transports each source page in the input tray past the code sensors and records the corresponding page identity information. When all source pages have been processed, the printer uses the page identity information to  
20 retrieve electronic versions of the pages, and uses these electronic versions to print "copies" of the source pages, bound into a single document. The printer consults a locally- or network-stored index of documents and/or pages to identify and retrieve the electronic versions of the pages.

- The user interface may allow the user to select or specify typical photocopying and  
25 printing options, including the number of copies, whether documents are bound, single-sided versus double-sided printing, scaling of page content, and media selection, including different media sizes.

- The printer controller 1040, a block diagram of which is shown in Figure 4, handles communication with host computers, manages the user interface, and controls the  
30 printing process. It consists of an integrated controller chip 1041 and a number of

separate components. The controller includes a processor 1042 which runs control software loaded into a DRAM 1044 from a flash memory 1046. The processor may also download control software from a host computer.

The printer controller communicates with host computers via a network interface 1046.

- 5 The network interface may provide direct connection to a host computer, such as a serial, parallel (IEEE 1284), Universal Serial Bus (USB) or IEEE 1394 connection, or connection onto a local-area network, such as an Ethernet, or connection onto a wide-area network, such as the Internet. The controller may include multiple such network interfaces.
- 10 The printer controller may include a disk controller 1056 for controlling a hard disk 1058 internal to the printer. The printer controller may use the hard disk for storing queued print jobs, i.e. documents, rasterized or partially-rasterized pages, and an index of documents and pages. It may also utilize storage provided by computers accessible via its network interface for some or all of these purposes.
- 15 If the printer includes a touch-sensitive color display user interface, then the printer controller includes a display controller 1060 for controlling a color display 1062, and a touch sensor 1066 overlaid on the display for capturing user interactions with the displayed user interface. The color display is typically a TFT color LCD, but may be any suitable display device, including, for example, an organic LED (OLED) display. The
- 20 printer controller captures input from the touch sensor 1066 via a parallel interface 1064.

The printer may include a number of user interface LEDs 1068 for indicating printer, paper and ink status information to users. The printer controller also controls these via the parallel interface 1064.

- The printer controller includes one or more image sensor interfaces 1060 for controlling
- 25 a corresponding number of image sensors 1074 used to capture images of code patterns appearing on source page surfaces. Each image sensor 1074 is typically a charge coupled device (CCD), but may be any suitable image sensor, including, for example, a CMOS image sensor. At least one illumination LED 1070 is typically associated with each image sensor. The printer controller also controls the illumination LEDs 1070 via the
  - 30 parallel interface 1064, although they may be more closely coupled with the relevant

image sensor interface 1060 to allow them to be efficiently strobed in synchrony with image capture.

- The printer typically includes one or two printheads 1052, depending on whether it has a duplex printing capability or not, although it may include additional printheads to achieve higher-speed printing or to support more complex ink sets.

- The printer controller includes a high-speed serial interface 1048 for communicating with a pair of print engine/controllers 1050, each of which controls a printhead 1052. In the preferred form of the printer, the printheads 1052 are high-speed inkjet printheads, and the print engine/controllers 1050 accept compressed page descriptions which they expand and send to the printheads in real time, described further in our earlier application USSN 09/\_\_\_\_\_ (docket no. SP05US).

- As described above, the printer may have an internal hard disk 1058, typically with multi-gigabyte capacity, for storing documents to be printed as well as rasterized or partially-rasterized pages. Alternatively it may rely on network storage for these purposes.
- The printer typically accepts documents described using a high-level page description language (PDL) such as Adobe PostScript or Microsoft Windows Metafile which encapsulates Graphics Device Interface (GDI) commands. In this case the processor 1042 rasterizes pages from the PDL to a format suitable for printing. Alternatively or addition-ally, the printer may accept rasterized or partially-rasterized pages directly.
- A variant of the printer controller, a block diagram of which is shown in Figure 5, incorporates a facsimile modulator/demodulator (modem) 1078, controlled by the processor 1042 via a serial interface 1076, which allows documents to be transmitted and/or received via facsimile. The advantages of manual collation of multiple source pages in relation to binding apply equally to manual collation in relation to facsimile transmission. The printer's user interface may give the user facsimile control via a dedicated keypad for telephone number entry and a dedicated button for transmission, but preferably provides a facsimile control user interface via the touch-sensitive display.

- More generally, the printer may allow the user to specify delivery of a manually collated document to a remote printer connected to a local-area or wide-area network which is addressable by the printer controller via its network interface 1046. The remote printer



may be a conventional printer, or it may be a printer with any of the capabilities of the printer of the present invention.

For the purposes of being remotely discoverable and addressable as a printer, the printer of the present invention may implement a protocol such as the Internet Printing Protocol.

- 5 The control flow of the printer is shown in Figure 6. During normal printing, the printer receives (at 1080) a document from a host computer, rasterizes (at 1082) the pages of the document, stores (at 1084) the rasterized pages on local or network storage 1088 (e.g. internal hard disk 1058), and finally prints (at 1084) the pages (or transmits them via facsimile). During copying, the printer "scans" (at 1090) the source pages (i.e. senses  
10 their codes), retrieves (at 1092) the corresponding electronic versions of the pages, and finally prints or transmits (at 1084) the pages.

#### CONCLUSION

- The present invention has been described with reference to a preferred embodiment and number of specific alternative embodiments. However, it will be appreciated by those  
15 skilled in the relevant fields that a number of other embodiments, differing from those specifically described, will also fall within the spirit and scope of the present invention. Accordingly, it will be understood that the invention is not intended to be limited to the specific embodiments described in the present specification, including documents incorporated by cross-reference as appropriate. The scope of the invention is only limited  
20 by the attached claims.

## CLAIMS

1. A printer for printing a collated multi-page document when presented with a plurality of manually collated pages, the printer including:
  - 5 (a) a code sensor which senses machine-readable codes on the manually collated pages;
  - (b) a control unit which uses the machine-readable codes to identify and retrieve previously stored electronic versions of the pages; and
  - (c) a print engine which prints the retrieved pages.
- 10 2. A printer according to claim 1 further including a binder for binding together the printed pages.
3. A printer according to claim 1 further including a scanner for copying pages
- 15 which do not have machine-readable codes on them and which produces electronic versions of the pages.
4. A printer according to claim 3 further including a storage medium which stores the electronic versions of the scanned pages.
- 20 5. A printer according to claim 1 further including a hand-held code sensor which senses machine-readable codes on the manually collated pages.
6. A printer according to claim 1 or 5 wherein the machine-readable codes on the
- 25 manually collated pages are represented:
  - (a) optically; or
  - (b) electronically; or

- (c) magnetically; or
- (d) topographically; or
- (e) chemically.

5 7. A printer according to claim 1 or 5 wherein the code sensor senses machine-readable codes on both sides of the manually collated pages.

8. A printer according to claim 1 wherein the control unit also controls communications between the printer and one or more peripheral devices.

10

9. A printer according to claim 1 wherein electronic versions of the manually collated pages which are to be printed are retrieved from at least one of the group including:

- (a) a storage medium contained within a host computer;
- 15 (b) a server which is accessed over a computer network;
- (c) a storage medium contained within the printer itself; or
- (d) any combination of the above.

10. A printer according to claim 1 further including an input device with which a  
20 user of the printer controls the format of the printed and collated multi-page document.

11. A printer according to claim 10 wherein the input device includes a touch sensitive display.

25 12. A printer according to claim 1 wherein the print engine also prints machine-readable codes onto a page, and wherein the machine-readable codes are not visible to human vision.

13. A printer according to claim 2 wherein the printer inserts blank pages in the printed document to duplicate blank pages contained within the manually collated pages.

5 14. A printer according to claim 1 wherein instructions from a hand-held code sensor are received and interpreted, and a collated multi-page document is produced.

15. A printer according to claim 1 further including an interface which transmits instructions for printing a collated multi-page document to a second printer.

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16. A printer according to claim 15 wherein the instructions are transmitted over a computer network or over a telephone network.

17. A printer according to claim 1 further including a storage medium which stores  
15 an electronic version of pages which have been printed.

18. A method of printing a collated multi-page document when presented with a plurality of manually collated pages, the method including the following steps:

- 20 (a) sensing machine-readable codes on the manually collated pages using a code sensor;
- (b) using the machine-readable codes to identify and retrieve previously stored electronic versions of the pages; and
- (c) printing the retrieved pages.

25 19. A method according to claim 18 further including the step of binding together the printed pages.

20. A method according to claim 18 further including the steps of using a scanner for copying pages which do not have machine-readable codes on them and producing electronic versions of those pages.

5 21. A method according to claim 18 wherein the step of printing the retrieved pages includes printing machine-readable codes on those pages.

22. A method according to claim 18 or claim 21 wherein the machine-readable codes are invisible.

10

23. A method according to claim 18 wherein the code sensor senses machine-readable codes on both sides of the manually collated pages.

24. A method according to claim 18 further including the step of using an input  
15 device to control the format of the printed and collated multi-page document.

25. A method according to claim 18 wherein the printing step includes the sub-step of transmitting the retrieved pages to a remote printer.

20

## ABSTRACT

The present invention relates to a printer for printing a collated multi-page document when presented with a plurality of manually collated pages, the printer including a code sensor which senses machine-readable codes on the manually collated pages, a control  
5 sensor which senses machine-readable codes on the manually collated pages, a control unit which uses the machine-readable codes to identify and retrieve previously stored electronic versions of the pages, and a print engine which prints the retrieved pages.

(Figure 1)

FIG. 1 is a block diagram of a printer system 100. The system 100 includes a code sensor 110, a control unit 120, a print engine 130, and a memory 140. The code sensor 110 is connected to the control unit 120. The control unit 120 is connected to the print engine 130 and the memory 140. The print engine 130 is connected to the memory 140.

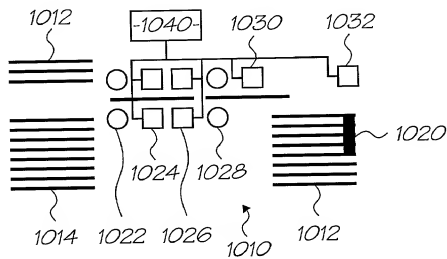


FIG. 1

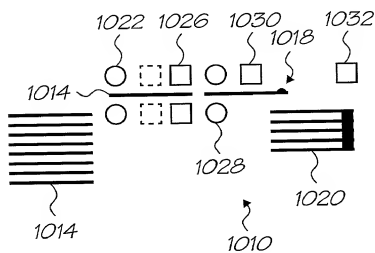


FIG. 2

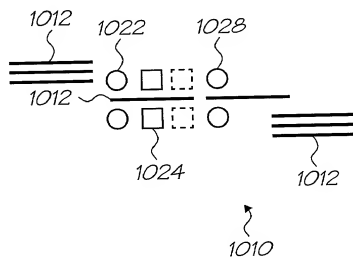


FIG. 3



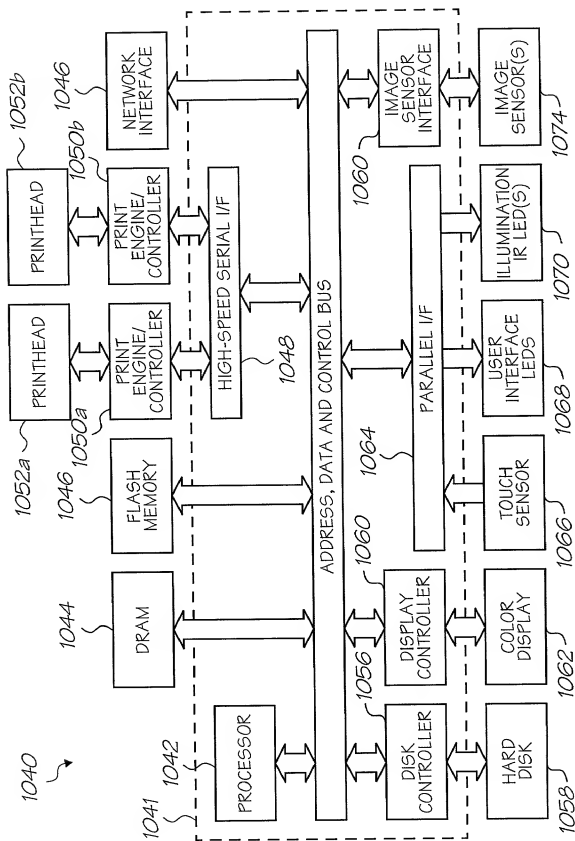


FIG. 4

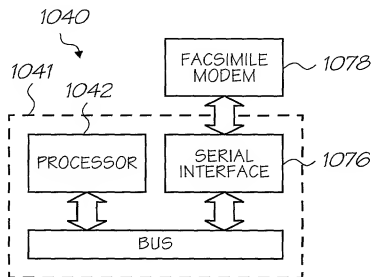


FIG. 5

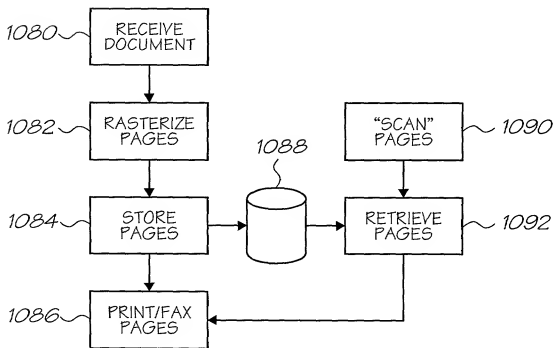


FIG. 6

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**PRINTER WITH MANUAL COLLATION CONTROL**

the specification of which (Title of the Invention)

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
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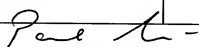
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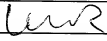
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